



# OCEANUS



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WOODS HOLE OCEANOGRAPHIC INSTITUTION  
WOODS HOLE, MASSACHUSETTS



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WOODS HOLE, MASSACHUSETTS

*Henry B. Bigelow*  
— Chairman of the Board of Trustees —

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— President of the Corporation —

*Edward H. Smith*  
— Director —

*Alfred C. Redfield*  
— Associate Director —

EDITOR: JAN HAHN

*Published semi-annually and distributed to the  
Associates of the Woods Hole Oceanographic Institution  
and others interested in Oceanography.*

*Composed and printed by the reproduction departments  
of the Institution.*

*Columbus O'D. Iselin*  
— Senior Oceanographer —



SHIP'S BLOCKS! WHAT MEMORIES YOU RECALL:

*The furious whistling of gale winds, through  
rigging held taut.*

*The gentle, rhythmic, creaking and slatting -  
heard by the watch below in quiet anchorages  
or while yawing on a heavy swell.*

SHIP'S BLOCKS! FOR MUCH YOU WERE RESPONSIBLE:

*The strength of your material saved ships,  
while its weaknesses lost them - thus bring-  
ing gladness or havoc to many shores.*

*The furious cannonades of grapeshot, whining  
through the rigging, brought you tumbling  
down - maiming and killing on the splintered  
decks below.*

*The ports from whence you came were enriched-  
as you hoisted the whales, the burdened  
fishing nets, the timber and the bales of  
goods.*

SHIP'S BLOCKS! NOT LONG WILL YOU REMAIN:

*The smaller brethren on board yachts will  
carry on,*

*The modern ship demands a block of thought-  
less steel.*

SHIP'S BLOCKS! YOU MUST NOT FEEL MALIGNED:

*The shops will sell you to carry a lamp or  
brace a shelf of books.*

*The form, the use, it matters not*

*The flavor of the sea is yours forevermore.*

SHIP'S BLOCKS! HOLD TAUT.

## EDITORIAL

With this issue OCEANUS will appear quarterly, instead of bi-annually. Our director, Admiral Smith, requested the purchase of a Vari-typer which should improve the readability of the text.

In the next issue we hope to be able to report on a most interesting and fantastic project for which the Institution prepared the groundwork. Such happenings give us a sense of adventure and discovery, rarely equalled in any other modern occupation.

For instance, the possibilities of future long range weather and climate forecasting are advancing step by step, due to work at this Institution and by other organizations. Dr. Joanne S. Malkus is studying how cumulus clouds in the Trade Wind regions supply the energy - easily large enough to drive the major wind systems around the world - by carrying latent heat in the form of water vapor from the sea surface into the atmosphere.

Mr. L. Valentine Worthington has made observations to sustain his theory that severe, temporary climate variations may cool and sink large masses of surface water into intermediate depths and that the last such occurrence was in about 1810.

These and other matters we hope to discuss in future issues of OCEANUS, to give our Associates and other friends a sense of partnership in developments which may open a brighter future for mankind.



## DEDICATION OF THE LABORATORY OF OCEANOGRAPHY

Ruffled by a blustery seawind the new building was dedicated on Monday, June 21st. The music of a Navy Band, the cries of seagulls and the whistles of departing boats gave the ceremony an appropriately nautical flavor.

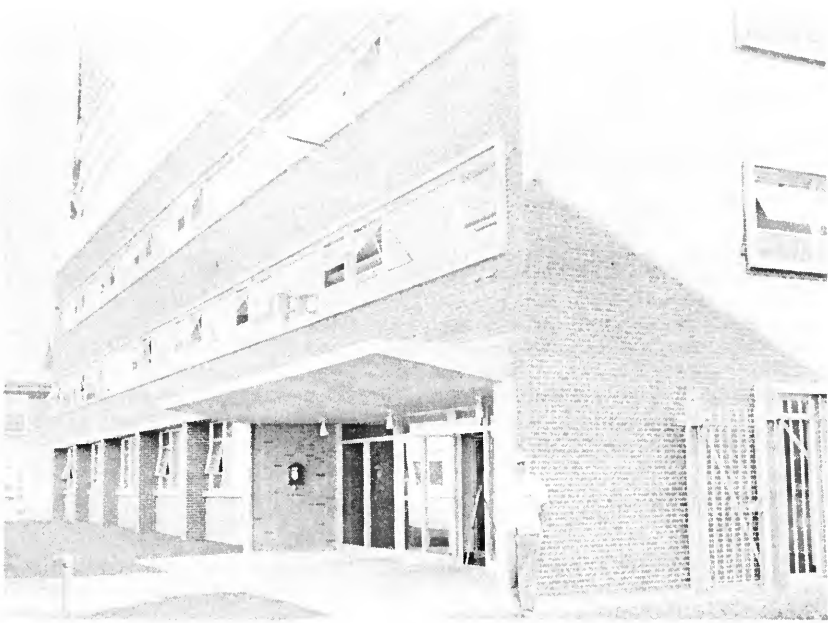
About 800 persons were present on the parking lot in the rear of the new building, where a platform and seats had been erected. Chief of Naval Research Rear Admiral F.R. Furth, U.S.N., acted as Master of Ceremonies and introduced the principal speakers: Dr. Detlev W. Bronk, President of the National Academy of Sciences and long a Trustee of our Institution and the Honorable James H. Smith Jr., Assistant Secretary of the Navy for Air.

Dr. Bronk cited the scientific climate of Woods Hole as a unique and wonderful place for the past and future growth of marine research. He also read a message from Admiral Robert B. Carney, Chief of Naval Operations stating: "Oceanography is part of the lifeblood of the Navy." During his speech, Dr. Bronk requested that Dr. Henry B. Bigelow stand up and "take a bow" and called him "The Father of American Oceanography."

Mr. Smith pointed out the Navy's interest in oceanographic research. Mentioning the nuclear-powered "true" submarines, the Assistant Secretary, said that they will need a vast amount of oceanographic knowledge, not only on underwater sound problems but also for navigation purposes. Mr. Smith finished by stating: "I know that our laboratory will assist the development of professional oceanographers, and encourage more young men and women to enter this young science, which is so important to the military defense of the United States and which holds such a promise for peaceful exploitation in the future."

The key to the new building changed hands several times during the ceremony and finally was handed to our Director, Rear Admiral Edward H. Smith, who accepted the technical and scientific operation of the building by the Woods Hole Oceanographic Institution. Ownership of the building remains in the hands of the Office of Naval Research, U.S. Navy. Following Dr. Bronk's example, Admiral Smith requested that Dr. C.O. 'D. Iselin stand up to be recognized for his great part in the development of our Institution and oceanography.

After the ceremony the new building was open to inspection and a large number of people took the opportunity to see the exhibits set up by various departments, and to inspect the research vessels "Atlantis" and "Bear" at the docks.



### *Convocation*

Following the dedication a three day scientific convocation was held in the auditorium which the Marine Biological Laboratory had graciously placed at our disposal. Planned under the auspices of the National Academy of Sciences-National Research Council, the convocation was attended by almost all the foremost oceanographers of the western world. The scientific discussions, covering physical, chemical and biological oceanography, marine meteorology, geology and geophysics will be published in a volume by the National Research Council. Dr. Alfred C. Redfield is the editor of the volume.

Not the least important part of the convocation were the informal discussions and contacts between the visiting scientists and our staff members. Oceanography, in effect, took a look backward at its accomplishments during the past 25 years and a look forward; through informal discussions of general problems which will guide us in the years to come.



## ASSOCIATES NEWS

The second annual Summer Cruise will take place on August 7th. Associates will have been informed of the event by letter.

The Institution's meteorological group refuses to make a weather prediction for that day beyond their favorite reply: "It's going to moderate."

Funds from the Associates were applied to invite Dr. Jule G. Charney of the Institute for Advanced Study in Princeton, N.J., as the Woods Hole Oceanographic Associates Lecturer for 1954. Dr. Charney gave a series of six lectures on modern developments in meteorology. This is a tangible, worthy, educational project made possible by the Associates, and the Institution desires to express its congratulations to them.

### *CORPORATE ASSOCIATES*

In the winter issue of OCEANUS, we mentioned that General Foods Corporation had become the first Corporate Associate. We are pleased to announce that the following organizations have joined during recent months:

Edo Corporation, New York  
The International Nickel Co., Inc., New York  
Minneapolis-Honeywell Regulator Co., Minneapolis, Minnesota  
Raytheon Manufacturing Co., Waltham, Mass.  
Shell Development Co., Houston, Texas  
Standard Oil Development Co., New York  
Union Carbide And Carbon Research Lab's Inc., N.Y.

Our brochure, "YOUR STAKE IN THE LAST FRONTIER," is available to Associates for further distribution to potential Corporate Associates.



## WHICH WAY AHEAD

by

*Alfred C. Redfield*

*Senior Oceanographer*

The purpose of the Woods Hole Oceanographic Institution, as set forth in its charter, is to prosecute the study of oceanography in all its branches. This gives us wide scope, since almost everything which happens on earth seems to be related in one way or another to events in the sea. It imposes no practical objectives, or political boundaries to our work. But with changing times and growing opportunities, new pressures inevitably arise which may deflect us from the wisest course.

I am presently participating in a commission to advise the educational authorities of the states bordering the Gulf of Mexico on what they should do to develop adequately the marine sciences in that area. This commission met recently with a gentleman influential in the preparation of the budget of one of these states' legislature. He opened the interview by saying, "You may wish to know why the legislature is ready to support the development of marine science." Then followed the best pep talk for practical oceanography I have ever heard--its relation to oil production, the chemical industry, fisheries, climate and rainfall, and all the rest. We were assured that any well-supported proposals we might make would be well received.

In the questioning which followed, he was asked what the legislature was prepared to do for the development of the fundamental science on which the practical benefits mentioned must rest. "I understand your point", he replied, "but that will have to be worked in indirectly. The legislators are unprepared to buy basic research at present."

It seems to me that people who are prepared to support research for practical ends should understand better what they are buying. Applied science presupposes a science to be applied. This is supplied by so-called basic research.

An institution enjoying philanthropic support must be concerned with human needs. But such needs are very varied, and are not limited to material things. One of the strongest human cravings is the satisfaction of curiosity--as anyone who has reared a child must know. Astronomy is justified by practical applications in surveying, navigation, and the measurement of time. Its support is due, however, to the mysteries it unfolds about the nature of the universe and the immensity of space and time. Many benefactions to astronomy, I am told, are due to some connection in the minds of the donors between heaven and the heavens.

I am sure that most of us are more affected by the unfathomed mystery of the sea, and a spiritual reaction to its strength and beauty, than by concern about where tomorrow's kippered herring is coming from. This is something we should be honest about.

If curiosity does not justify free scientific endeavor, the whole history of human progress shows that it pays. It has recently been stated that public moneys should not be spent for the benefit of a limited minority of intellectuals. No statement could show more ignorance of history. It denies the public value of the work of Archimedes, Galileo, Newton, Faraday, and the host of other scholars whose curiosity about the nature of things laid the groundwork for the technology on which civilization now depends. Such expenditures may be inexpedient politically, but practically they are more than justified.

Our Institution for the study of the ocean is unique in its independence of state or nation. It is not controlled even by the policies of any university. It is private enterprise at its freest. This is our most precious endowment.

What policies and practices should guide us in developing its future?

### *Exploring the unknown*

When you set out to explore the unknown, it is impossible to know where you are going. Scientific advance depends on the ripeness of time. One discovery suggests the next promising inquiry. A new technique creates the possibility of advances, frequently in very unexpected directions. These are the reasons that important discoveries are often made simultaneously but

independently by different people. A long-range plan is almost sure to lead to a cul-de-sac where further progress is unprofitable.

The best one can do is to look for promising openings into the unknown--to select fields of inquiry where new knowledge, new techniques, or bold hunches suggest that progress can be made--and to find men with impelling curiosity and prepared minds to explore these fields. The discovery of such men is the crux of the problem of administering research in fundamental science.

Dr. Revelle, the Director of the Scripps Institution of Oceanography, who arranged for much of the work in oceanography done for the Navy during the war, once told me that the only people who really accomplished anything were those who worked on problems they had themselves conceived. This is a lesson we should always remember. The men with the character to carry sustained scientific inquiry to an original conclusion are driven by a personal devil which will take little advice and stand no interference. Men without this devil may be useful to others, but they are incapable of leading expeditions very far into the unknown.

This is why our Institution must allow its staff to follow their own noses in conducting their inquiries--must insist that research be free of limiting direction.



### *The first years*

To demonstrate that a staff chosen on the principles I have suggested--of basic research and free research--can pave the way toward practical ends, I will recall the conditions under which we started, in 1930. At that time there were practically no oceanographers in this country. Dr. Bigelow, our

## *Which way ahead~*

first Director, was compelled to select his staff wherever he could find competent scientists who had shown any interest in the sea, or who were willing to develop such interest. Only three of them had ever been to sea on a research vessel. The others were university teachers; a chemist, a bacteriologist, a meteorologist, and the like, all of whom saw interest and promise in the opportunity at Woods Hole. We came to Woods Hole in June, bringing our students with us; we took short trips on the ATLANTIS learning the ropes; and we returned to our colleges in the fall. Our scientific output was not unimpressive--but appeared to be utterly useless.

## *The War years*

After ten years came the war. Somewhat to our surprise we discovered that we had developed a group of men who were unique in their experience in conducting scientific work at sea. Around this core were assembled the research groups which crowded our laboratory and brought the Institution distinction for its work in the war effort.

A detailed case shows directly how fortuitous knowledge gained in the interest of pure science was combined for the most practical purposes. All oceanographers are intrigued by the motion of the great ocean currents, even though there has been little practical demand for their study since the development of the steamship. Dr. Iselin made the study of the Gulf Stream his speciality and was thoroughly familiar with the detailed distribution of temperature and salinity in the ocean, since at that time these were the chief data from which ocean currents were deduced. Dr. Ewing came to Woods Hole during the prewar years to study the structure of the ocean floor, for which purpose he employed sound waves to probe the depths of the water and the underlying rocks. This combination of knowledge, of the temperature and salinity of ocean water and of the physics of sound transmission, was just what was needed when it was discovered that the ranges at which ships could be detected by echo-ranging instruments were greatly affected by the physical condition of the sea. Even before Pearl Harbor, the basic theory for the prediction of sound ranges under varied sea conditions had been developed by Iselin and Ewing and the Institution was launched on a practical program of research for the Navy.

## *Gulls, air currents and smoke screens*

Another case will illustrate the values which may come from a policy of freedom in the direction of research and perhaps from luck in finding a man with an exceptional bump of curiosity.



When the Institution was established a young man was working on a farm, having just given up his first year of college for lack of funds. He wanted a job on the ATLANTIS and became ship's technician. His task was to read the thermometers and measure the salt in the samples of water wherever the ship went. Between stations he liked to watch the sea and the sea birds, as who does not. But this was a curious and a thinking fellow who made something of what he saw. First he noticed that gulls are lazy fliers who take to the air only when they can soar on ascending air currents, next that this occurs only when the air is clear and cool. Gulls do not go far to sea in summer. Next followed measurements of sea and air temperature and the difference in these temperatures. When the observations were coupled with the behavior of the gulls, relations appeared between wind velocity, air and water temperature, the occurrence of ascending air currents, and their angle. This was new knowledge about the behavior of air over the sea.

When war spread to the Pacific, smoke screens refused to obey the manual. Official doctrine had been developed from tests conducted over land, where the air sometimes behaves quite differently than at sea. The casual wondering of this technician on the ATLANTIS explained the trouble and led to the development of better rules for an important tactical operation.

This is but one of several bright ideas which this man has developed. His formal education would not qualify him to teach in a country high school, yet left to himself he has become a scientist of international repute and one of our proudest possessions.

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## STAFF MEMBER HONORED

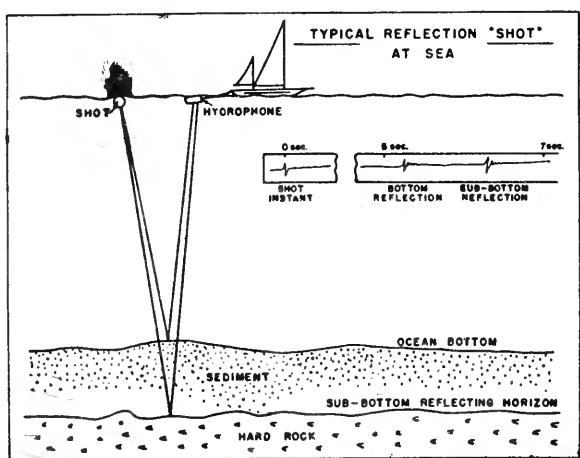


Diagram of a seismic technique to estimate the thickness of sediment on the ocean floor.

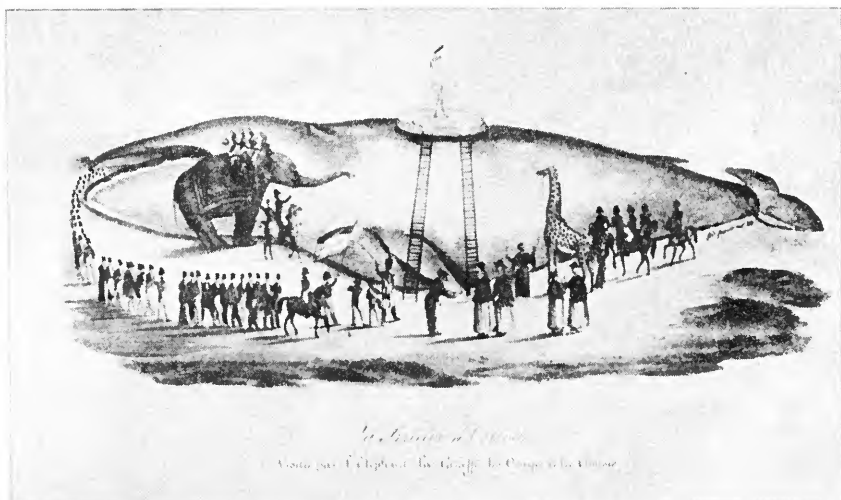
The Society of Exploration Geophysicists' Award for the best paper in 1953, was presented on April 13th to Dr. Charles B. Officer Jr., geophysicist on our staff. The ceremony was held at a joint meeting of the American Association of Petroleum Geologists, the Society of Exploration Geophysicists and the Society of Economic Paleontologists and Mineralogists, held at St. Louis, Missouri.

Dr. Officer's paper was entitled: "The Refraction Arrival in Water Covered Areas," and considered the transmission of sound through the unconsolidated layers of sediment on the seafloor. The paper also described a new method to determine the character of the materials below the bottom.

This work is of great interest to petroleum geologists, looking for oil deposits on the continental shelf, and to geophysicists in general who are interested in learning more about the structure and character of our earth.

Published in the October 1953 issue of *Geophysics*, the paper carried contribution number 629 of the Woods Hole Oceanographic Institution.

Dr. Officer returned recently from New Zealand where he spent a year on a Fulbright Fellowship studying the crustal structure of the southwest Pacific.



## OF WHALES, FUEL OIL AND AMBERGRIS

"If you ever, ever, ever  
"tread upon a whale its tail,

"You will never, never, never  
"Want to meet another whale."

### Whales

We all know that whales are large but never realize how big they really are until one floats ashore somewhere and immediately becomes a problem to the local Town Fathers.

Three very dead whales beached in our area during recent months. One followed the example of the Pilgrims and landed on some rocks at Plymouth, another beached on the south shore of Nantucket and a third, having heard of the attractions of Martha's Vineyard, visited near Edgartown.

## Whales~~

The Plymouth whale arrived in late December to the dismay of local officials.

They called the U.S. Coast Guard, who said: 'Not our problem, it's on the beach.'

They called the Police Department which said: 'Not our problem, it's not disturbing the peace.'

So, they called the Public Health Department which only had to open a window to realize it was their problem.

The Public Health Department called the Woods Hole Oceanographic Institution. After hearing their tale of woe, we felt like saying: 'Not our problem,' but true to our policy of being helpful to all inquirers suggested that the leviathan be towed to deep water.

'Impossible,' it was high on the beach, the water was so shallow that no boat could come anywhere near, the beast had no tail and it was too dead to hold a hook in its body. 'Cut it up and bury it then.' Again, impossible. The beach consisted of large rocks, it was at the base of high inaccessible bluffs and besides: 'How does one cut up a sixty ton, fifty foot whale?'

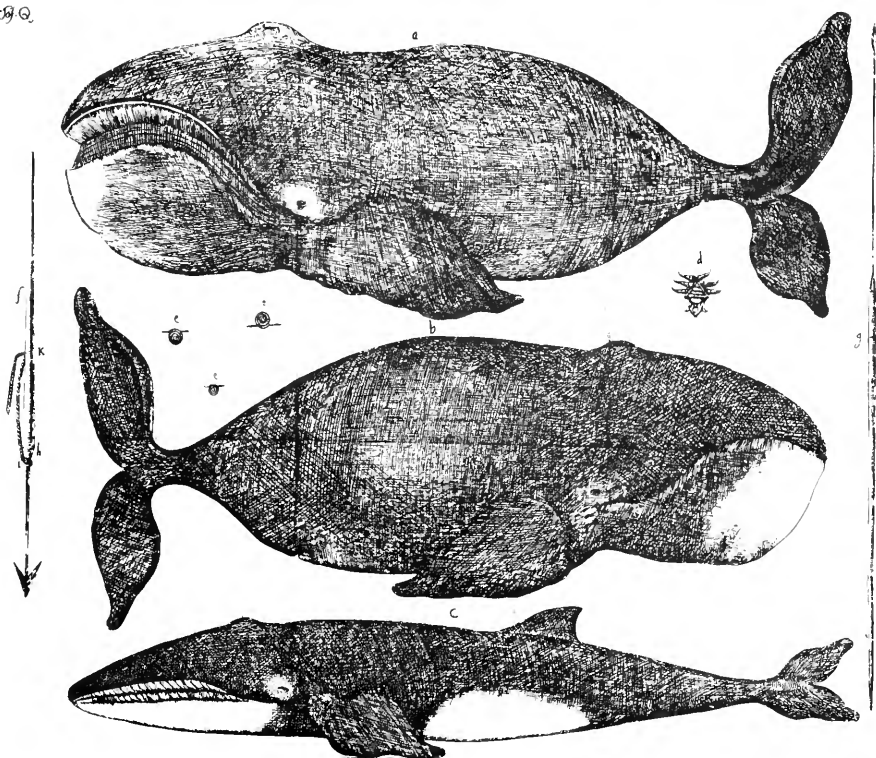
For a moment our thoughts wandered to the collection of old New Bedford cutting spades hanging on our study wall, and to the enticing possibility once more to put them to their task. 'All right, douse it with fuel oil and burn it then.'

### *Fuel oil*

And burn it they did. It was not easy. For a while all that burned was the oil, to the delight of the company supplying the fuel. The incoming tide put an end to the operation which was resumed the following day by directing the fuel under pressure from a Fire Department truck.

The entire procedure took 4,265 gallons of fuel oil, equal to the winter consumption for three well heated homes and costing about \$500.00. Not a high price to pay for the removal of the unwanted guest. The big cremation was gleefully described in the Orange Disc, a shareholders magazine of the Gulf Companies.

Later in the spring the Nantucket Visitor arrived. William E. Schevill, our whale expert who loves to take whales apart, planned to fly Nantucketward but bad weather interfered. No more was heard from the island, so that we presume the stormy weather took the carcass back to sea. It may well be the same mammal which arrived last month in an unhappy condition at the south beach near Edgartown.



### *Ambergris*

On the Vineyard, the old whaling spirit is not dead, possibly since it is kept alive so well by the editors of the Vineyard Gazette. *Ambergris!* was the cry, echoing through the quiet off-season streets of the town. Armed with old whaling tools, spades and axes, citizens took the whale apart, thus relieving the Selectmen of the usual worry.

Sample after sample of the most smelly material arrived at the Institution for analysis. Now, we first must tell you that we have two annual ambergris seasons, so that we have become fairly expert at identification. What is more, Mr. William C. Schroeder owns a small piece of ambergris, which has a faint but penetrating and lasting sweet smell and has the texture of beeswax.

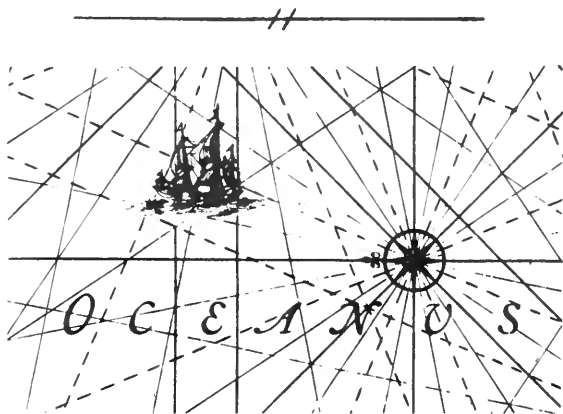
Every spring when people start walking the beaches and every autumn when sunbathing and swimming no longer is comfortable, the samples arrive. Sometimes it is sticky scrapings from the inside of an old paint can, sometimes old margarine, sometimes part of a dead fish or other decaying organic matter, sometimes it is green cheese, or even a jellyfish, but always it has an extremely bad odor, as Biologist Hal Turner, our un-official "ambergris tester," can testify. This would not be so discouraging, if once in a while someone did find ambergris. This has not happened in the history of the Institution.

None of the Edgartown samples were ambergris, nor were chemical tests necessary. The reason became apparent when our Mr. Gerrit Duys who lives on the Vineyard, obtained some photographs of the remains of the whale which clearly showed it to be a baleen whale. Ambergris is found only in sperm whales.

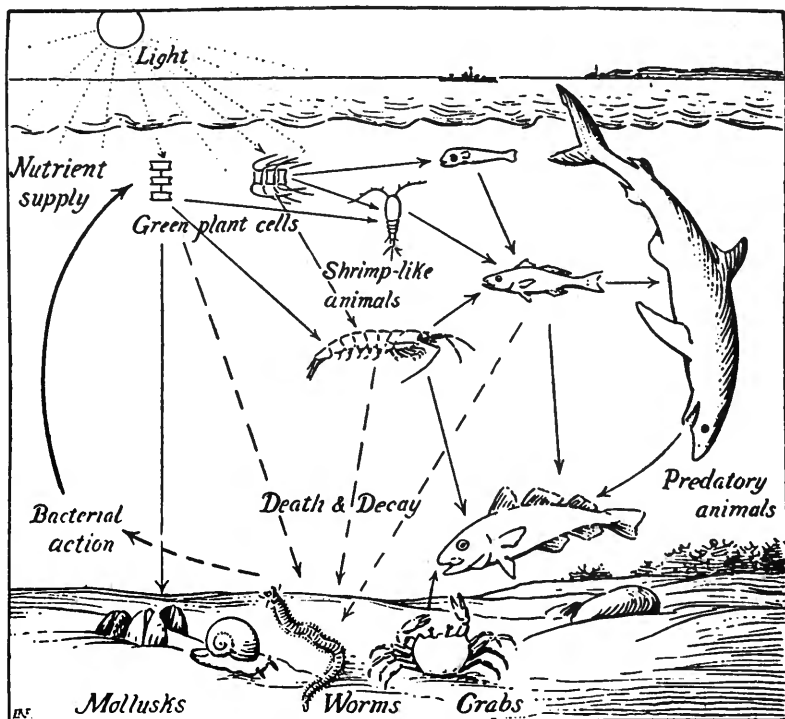
We understand that disappointment was great in Edgartown and dreams of wealth were rudely shattered. As a matter of fact, we do not even know if the reputed value of ambergris still exists. There is a buyer in London, but although admittedly we have not tried hard, we do not know of anyone in this country who would buy the stuff if it were found. As far as wealth is concerned, when visiting the Azores on board the Albatross several years ago we were shown a hunk of ambergris about twice the size of a man's head. The shoeless owner of the hunk - who like many Azoreans was dressed in shirts and trousers patched so often that none of the original material remained - admitted that the sample shown was small compared to others he had found.

Frankly, the Edgartown whale could bring a decent price if someone had been foresighted enough to collect and clean the bones and vertebrae, since many summer visitors would pay a good price for the souvenirs, to be used as doorstops or garden ornaments.

Well, let us hope for more beached whales next season. Mr. Schevill hopes to find a species uncommon to our shores, or perhaps the mysterious Atlantic gray whale which reputedly existed many years ago. Mr. Turner hopes to see a real piece of ambergris brought in, if only as a reward for his insulted nose; while we hope to obtain some jaw bones to be used as a garden gate.



## LIFE IN THE SEA



Diagrammatic representation of the components of the production cycle in a marine area. (After Clarke, from "Science from Shipboard," Science Service, 1943.)

How much life the ocean can produce, i.e. the productivity of ocean water, is one of the central points of interest in marine biology today. This summer three distinguished scientists are visiting the Institution to study some basic problems connected with the productivity of the sea.

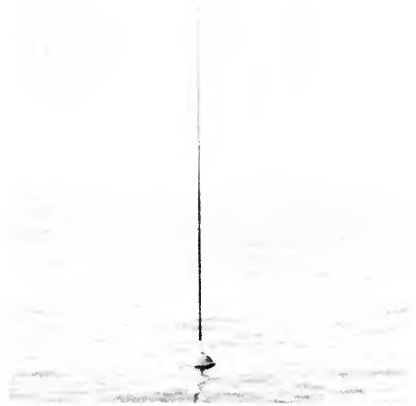
Working independently on related problems are: Professor E. Steeman Nielsen of the Danmarks Farmaceutiske Højskole at Copenhagen; Professor John E.G. Raymont of the University of Southampton, England; and Professor Mary-Alys Plunkett of Vassar College.

Professor Nielsen has made valuable studies of plant production in tropical seas with the aid of radio-active isotopes. He took part in the circumnavigating cruise of the Danish research vessel *Galathea* during 1950 and 1951.

Professor Raymont has made most interesting studies of the fertilization of marine areas. In one fertilized Loch on the coast of Scotland he was able to grow flounders to a five year old size in a two year period. Professor Plunkett has contributed to our knowledge of the dissolved organic content in seawater.



## NEW INSTRUMENTS



*AN INSTRUMENT BUOY RETURNS LIKE A FAITHFUL DOG WHEN CALLED AND BARKS TO SHOW ITS PRESENCE.*

*"The nicest radio program in the world,"* exclaimed David H. Frantz Jr., recently on board the research vessel ATLANTIS when he heard the 'Bleep-Bleep,' of a radio buoy surfacing about one mile from the ship.

With this deathless quote, a new era in oceanographic research has started. Until recently we worked almost entirely with spot observations. The size of our vessels makes work in the North Atlantic difficult during the winter months so that a situation exists which is somewhat parallel to the making of detailed weather observations in Massachusetts during the summer, in North Carolina in the fall and in Florida during the winter time.

To fill the large gaps in our knowledge, the Institution has worked for several years on the development of instruments which may be moored at the ocean bottom or at intermediate depths and may be left for a considerable period to obtain a continuous record of changes in temperature, current velocity, etc. Several such instruments were developed by Mr. L.A. Thayer. It is an easy task to throw the buoys overboard but how to find them back turned out to be a very narrow bottleneck indeed.

Consequently, David Frantz, research associate in engineering, started to develop a buoy which, like an obedient dog, would come to heel when called. He developed a system whereby the shock waves from an underwater explosion, set off in the neighborhood of a buoy, activate a relay which releases the anchor so that the floating buoy with its attached instruments can return to the sea surface.

### *Sea trials*

In March of 1953 we went to Bermuda with the first pilot models of the buoy. They were rather clumsy affairs, consisting of ten foot long steel pipes, about 4 inches in diameter, while the floating mechanism consisted of a large wooden barrel, filled with paraffin.

Bermuda was chosen as an ideal locality. Deep water may be reached there within a few hours sailing and the weather presumably would be ideal. Unfortunately, the permanent Bermuda-Azores High pressure system was displaced for once, so that the weather was none too good.

On the first trial, the buoy was lowered on a cable from the research vessel Caryn, just to make sure that it would come back. Photographs were also taken. This is an excellent idea before a new instrument is lowered since there may never be another chance to do so. Frantz and the writer were lowered in a dory, containing four 100 lb. aerial bombs and a quantity of TNT blocks.



It is surprising how different the sea looks the minute you step into a small boat. Within a few minutes rowing we could not see the Caryn, except when we rode over a large wave. After Frantz determined that we were far enough from the Caryn, we struggled to prepare the bombs. For this, it was necessary to unscrew the detonator in each bomb, pull it out and lash four  $\frac{1}{2}$  pound blocks of TNT around the lethal monster. Finally a pressure detonator was inserted which would go off at a depth of one mile, igniting the TNT blocks which in turn would set off the bomb.

It was no easy task to lift the 100 pounder over the side of the heaving dory. Both of us, being used to the steadier motion of the Caryn were not feeling our best. The lifting exertion and the thought of the splash the bomb might make if it dropped back in the dory also kept us quite warm in the cool weather.

Over it went! The dory righted itself with the released weight and Frantz started to count. We wondered a little if the explosion, even one mile down, would heave the dory out of the water and decided there was little sense in rowing away from the spot.

Nothing happened. Another charge and then another with subsequently shallower depth detonators. No explosion. Finally, we were bright enough to realize that the wind and the sea had driven the dory up the steep underwater slope of Bermuda, so that the bombs were on the bottom in shallower water than that for which the detonators were set.

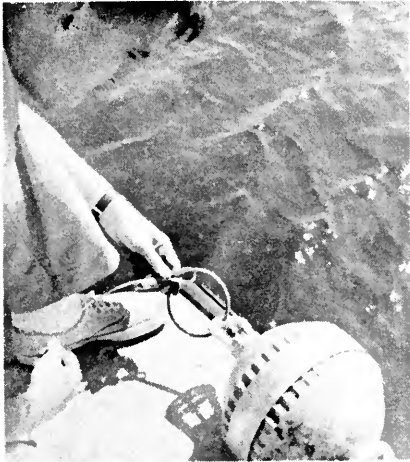
We give you this description only as an example of the many unexpected things that can go wrong in oceanographic research and that the development of new ideas does not happen overnight.

### *Excelsior!*

Since last year, Frantz and Sloat F. Hodgson have made extensive improvements which culminated early in June with the successful recovery of a buoy. The instrument consists now of a light pole about 20 feet long, fitted with three aluminum balls which act as floaters and contain the releasing mechanism as well as a radio set.

A simple 2 pound charge of TNT is capable of calling the buoy within a radius of six miles. As soon as the tripping mechanism is released, the buoy begins to send out a radiosignal which can be heard at a distance of 20 miles and on which the ship can "home". It was the long "Bleeep" of this signal which gave us our opening quote.

In the not too distant future a series of unattended instruments will be set at carefully located spots in the Atlantic Ocean. The net effect will be a great expansion of our fleet, since each buoy with its instrument may be compared to an anchored vessel making continuous observations.



Close-up of releasing mechanism, and setting buoy from a small craft.

## GIFTS AND GRANTS

The Institution has granted fifteen fellowships to visiting scientists and graduate students. This program which has been in existence since 1930 has been one of the most successful means of recruiting oceanographers and disseminating interest in the science.

The National Research Council granted the sum of \$8,000 to Dr. Francis A. Richards, chemical oceanographer on our staff, to aid research in the significance of Chlorophyll C.

This green pigment in microscopic seaplants may be much more abundant, and therefore more important, in the carbon economy of the world than was formerly believed. The studies of Dr. Richards and his assistant, Grace I. Creitz, may lift the veil of another important problem connected with the productivity of the sea.

## CURRENTS AND TIDES

Our Gulf Stream advice to the participants of the Bermuda ocean race was "incredibly accurate", according to the navigators of the yachts. The July issue of "Yachting" will carry an account of the race in Alf Loomis' "Under the Lee of the Longboat". The Institution feels pleased and flattered to have received so much goodwill.

John W. Zeigler, recently appointed as research associate in geology, received his doctorate degree from Harvard University on June 17th. Dr. Zeigler's thesis was entitled: "Geology of the Blacktail area, Beaverhead County, Montana.

Is North Dakota inhabited? During the past seven years about 30,000 people from all other states and many foreign countries have signed the guest register at our summer exhibits. Not one came from North Dakota.

A handsome diorama of the buildings, docks and ships will be exhibited in the lobby of the Laboratory of Oceanography. The display was built by Mr. Hugh Price of the Boston Museum of Science.

"Scientific Carpenter Shop" was the sign on Stanley Eldredge's door for the "Open House" after the Dedication ceremonies. Mr. Eldredge is proud of the fact that he has built hundreds of items to be used in scientific research.

Our Senior Biologist Dr. Alfred C. Redfield and Administrator N.T. Allen journeyed to Bermuda in June to attend an executive meeting at the Bermuda Biological Station. Dr. Redfield is a Trustee of the Station while Mr. Allen has been the treasurer for a number of years.

The future of a possible New England fishery will soon be decided. Early in June the Atlantis brought in a few bushels of the red deep sea crabs discovered by Mr. William C. Schroeder. Kept on ice, the crabs were shipped to Boston where the feasibility of processing the meat for canning will be studied.

If the process gives satisfactory results a new fishing industry will be possible. Large landings of lobsters already are being made from the offshore areas discovered by Mr. Schroeder during recent years.





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